

Claims

What is claimed is:

1. A method for preparing a hard cheese without whey separation, said method comprising:

5 (1) mixing liquid milk and a dairy protein ingredient to form a blend, wherein dairy fat can optionally be added to the milk, wherein a lactic acid-producing dairy culture can optionally be added to the milk to convert lactose into lactic acid and generate more flavors, and wherein the dairy protein ingredient is a modified milk protein concentrate, and;

10 (2) mechanically working and heating the blend at a temperature of about 130 to about 190.degree. F. to form a cheese, wherein optional ingredients such as gum and other supplements can be added during the heating process; and

 (3) collecting the cheese,

15 wherein the process does not generate processing waste or whey, wherein all milk and the added dairy protein ingredients are converted into cheese with all whey proteins captured, and wherein the hard cheese has texture and organoleptic properties comparable to a natural hard cheese prepared in a conventional process.

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2. The method of claim 1, wherein the dairy protein ingredient is a modified milk protein concentrate having a protein content of greater than 50 percent, and wherein the resulting cheese have all whey proteins captured.

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3. The method of claim 1, wherein the blend of milk and dairy protein ingredient is heated to about 130 to about 190.degree. F., and more preferably to about 155 to 175.degree. F., with continuous mixing and working.

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4. The method of claim 1, wherein the mixture of milk and dairy protein ingredient is heated to about 155 to about 175.degree. F., held at the temperature for about

0.2 to about 10 minutes, preferably less than 2 minute, to complete the heating and working process.

- 5 5. The method of claim 1, wherein the hard cheese is a mozzarella cheese having texture and organoleptic properties comparable to a natural mozzarella cheese prepared in a conventional mozzarella process.

6. The method of claim 5, wherein the mozzarella cheese is a low-fat product having texture and organoleptic properties comparable to a natural mozzarella cheese prepared in a conventional mozzarella process.

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7. The method of claim 5, wherein the mozzarella cheese has all whey proteins captured with a ratio of whey protein to casein up to 20/80 and having texture and organoleptic properties comparable to a natural mozzarella cheese prepared in a conventional mozzarella process.

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8. The method of claim 1, wherein the hard cheese is a cheddar-style cheese having texture and organoleptic properties comparable to a natural cheddar cheese prepared in a conventional cheddar process.

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9. The method of claim 8, wherein the cheese is a low fat cheddar-style cheese with all whey proteins captured and having texture and organoleptic properties comparable to a natural cheddar cheese prepared in a conventional cheddar process.

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10. The method of claim 1, wherein the product is a hard cheese made from milk and a dairy protein ingredient, wherein the hard cheese has all whey proteins captured.

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11. The method of claim 10, wherein the hard cheese is a low fat hard cheese containing less than 60 percent moisture and all whey proteins are captured, and wherein the all whey captured low fat hard cheese having texture and

organoleptic properties comparable to a natural hard cheese prepared in a conventional process.

- 5 12. A method for preparing modified milk protein concentrate that can be used for making all whey proteins incorporated hard cheese without whey separation, said method comprising mixing about 82 to about 96 percent milk protein concentrate and about 4 to about 18 percent multifunctional dairy enzyme to form a blend, wherein the milk protein concentrate has a protein content of greater than 55 percent, and wherein the multi-functional dairy enzyme is a
- 10 blend of ingredients preferably selected from the group consisting about 2 to about 8.0 percent cheese flavor, about 2 to about 8.0 percent cheese powder, about 2 to about 8 percent salts, about 0.1 to about 3 percent lipase, about 0.01 to about 3 percent proteases, about 10 to about 60 percent emulsifiers, about 1.0 to about 8.0 percent calcium salts, about 3 to about 10 percent calcium
- 15 caseinate, about 1 to about 6 percent lactic acid, and adequate amount of skim milk powder.
13. The method of claim 12, wherein the multifunctional dairy enzyme system is a mixture of proteases, peptidases, lipases, lactase, and other intrinsic enzymes
- 20 from cultured milk, wherein the protease is present at about 0.001 to about 0.5 percent, wherein the lipase is present at about 0.0001 to about 0.2 percent, and wherein lactase and other intrinsic enzymes are present at about 0.01 to about 2.0 percent.
- 25 14. The method of claim 12, wherein the multifunctional dairy enzyme system is a mixture of salts and emulsifiers, wherein the salts include calcium salts, potassium salts, and sodium salts and are present at about 3 to 16 percent, wherein the emulsifiers include sodium citrate, calcium phosphate, potassium phosphate, sodium phosphate and are present at about 10 to 60 percent as a
- 30 mixture of them.